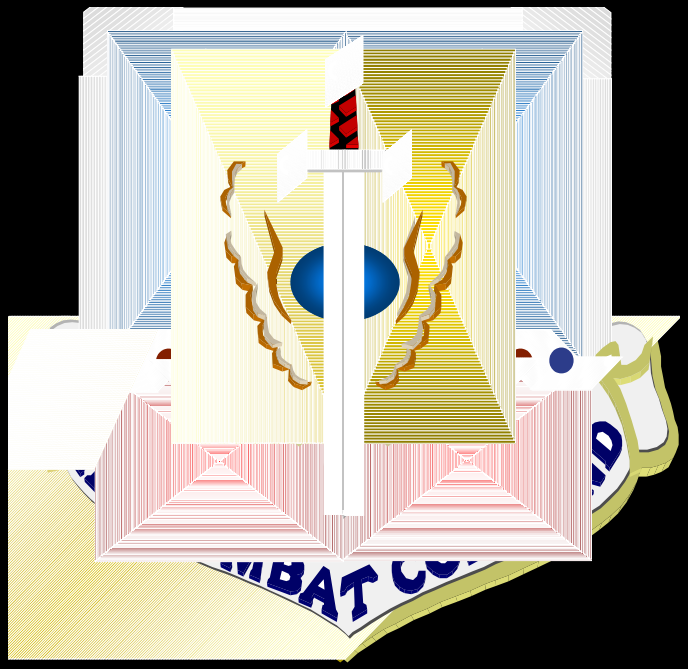


Sustainable Design

2 Aug 01

Larry H. Dryden, P.E.

PURPOSE

- **Provide Informational Brief on ACC's Experience and Lessons Learned Using Sustainable Design**

OVERVIEW

- First out – Squadron Operations, Seymour-Johnson AFB, NC
- First LEED - Fitness Center, Barksdale AFB, LA
- Under construction – Dorm, Barksdale AFB, LA
- Bid – Dining Hall, Shaw AFB, SC
- Design – Education Center, Shaw AFB, SC
- Lessons Learned

Squadron Operations, S-J AFB

- ACC's first attempt using sustainable design
- FY 96 MILCON
- Design started in Feb 96
- AE of record is Clark Nexsen, Norfolk, VA
- John Barrie Associates hired as a "Sustainable Consultant" using P2 funds
- Produced the ACC Sustainable Facilities Guide

Squadron Operations S-J AFB

White Roof (behind parapet)
Recycled Content – Block, Steel, GWB

Squadron Operations S-J AFB

Durable surfaces

Natural Lightin

Automated Lighting Controls

Low VOC Paints

Fitness Center, BAFB

- First ACC LEED Project
- FY 98 Congressional Insert
- AE of Record KBJ Architects, Jacksonville, FL
- Sustainable Consultant Bradley Guy, University of Florida, Gainsville, Fl

Fitness Center BAFB

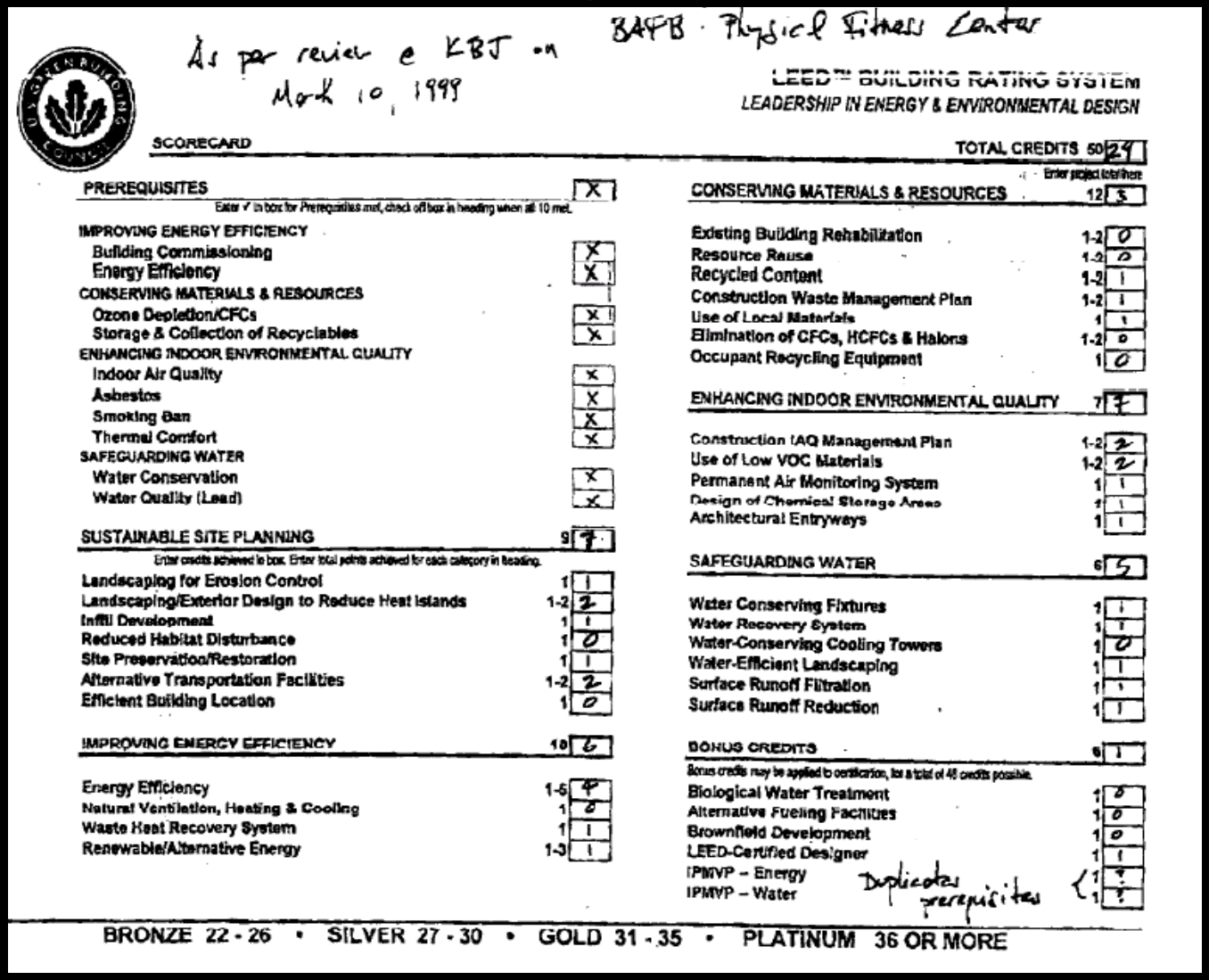
- **Goals:**
  - **Maintain schedule to award in the year of appropriation (FY 98).**
  - **Maintain the existing scope (4425 SM) and budget (PA $9.3M)**
  - **Obtain a Bronze LEED rating (22 points min.)**
  - **Use Best Value Source Selection procurement**

Fitness Center BAFB

- Process
  - Identify project as a “green” building
  - Establish goals
  - Assess design team capabilities/experience
  - Hire “green” consultant
  - Conduct strategy meetings to identify opportunities
  - Conduct preliminary LEED evaluation
  - Have DSM contractors evaluate options based on life cycle costs (use 35% design)
  - Make design decisions and complete design

Fitness Center BAFB

Final Design LEED Score Card



As per review e KBJ on March 10, 1999

BAFB · Physical Fitness Center

LEED™ BUILDING RATING SYSTEM
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

SCORECARD — TOTAL CREDITS 50: 29 (Enter project total here)

PREREQUISITES X
Enter ✓ in box for Prerequisites met, check off box in heading when all 10 met.

IMPROVING ENERGY EFFICIENCY
- Building Commissioning: X
- Energy Efficiency: X

CONSERVING MATERIALS & RESOURCES
- Ozone Depletion/CFCs: X
- Storage & Collection of Recyclables: X

ENHANCING INDOOR ENVIRONMENTAL QUALITY
- Indoor Air Quality: X
- Asbestos: X
- Smoking Ban: X
- Thermal Comfort: X

SAFEGUARDING WATER
- Water Conservation: X
- Water Quality (Lead): X

SUSTAINABLE SITE PLANNING 9: 7
Enter credits achieved in box. Enter total points achieved for each category in heading.

Landscaping for Erosion Control	1	1
Landscaping/Exterior Design to Reduce Heat Islands	1-2	2
Infill Development	1	1
Reduced Habitat Disturbance	1	0
Site Preservation/Restoration	1	1
Alternative Transportation Facilities	1-2	2
Efficient Building Location	1	0

IMPROVING ENERGY EFFICIENCY 10: 6

Energy Efficiency	1-5	4
Natural Ventilation, Heating & Cooling	1	0
Waste Heat Recovery System	1	1
Renewable/Alternative Energy	1-3	1

CONSERVING MATERIALS & RESOURCES 12: 3

Existing Building Rehabilitation	1-2	0
Resource Reuse	1-2	0
Recycled Content	1-2	1
Construction Waste Management Plan	1-2	1
Use of Local Materials	1	1
Elimination of CFCs, HCFCs & Halons	1-2	0
Occupant Recycling Equipment	1	0

ENHANCING INDOOR ENVIRONMENTAL QUALITY 7: 7

Construction IAQ Management Plan	1-2	2
Use of Low VOC Materials	1-2	2
Permanent Air Monitoring System	1	1
Design of Chemical Storage Areas	1	1
Architectural Entryways	1	1

SAFEGUARDING WATER 6: 5

Water Conserving Fixtures	1	1
Water Recovery System	1	1
Water-Conserving Cooling Towers	1	0
Water-Efficient Landscaping	1	1
Surface Runoff Filtration	1	1
Surface Runoff Reduction	1	1

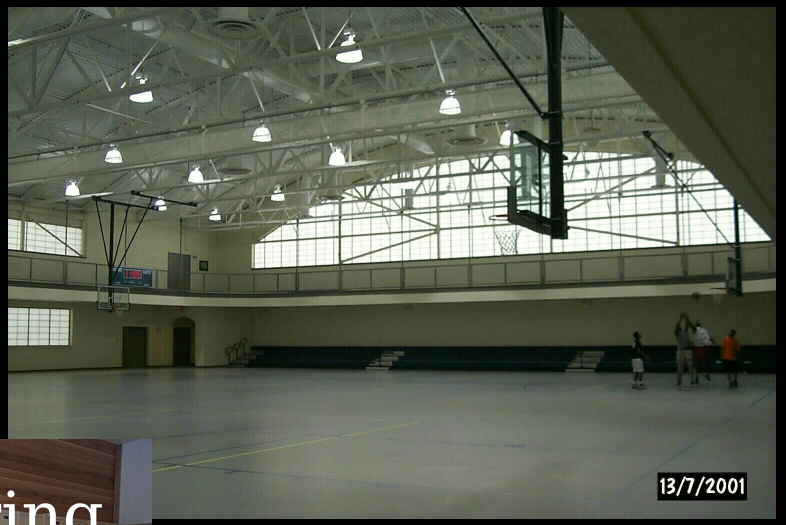
BONUS CREDITS 6: 1
Bonus credits may be applied to certification, for a total of 46 credits possible.

Biological Water Treatment	1	0
Alternative Fueling Facilities	1	0
Brownfield Development	1	0
LEED-Certified Designer	1	1
IPMVP – Energy	1	?
IPMVP – Water	1	?

Duplicates prerequisites

BRONZE 22 - 26 • SILVER 27 - 30 • GOLD 31 - 35 • PLATINUM 36 OR MORE

Fitness Center BAFB



Recycled Rubber Flooring

Recycled Plastic Lockers

Compact Fluorescen

Fitness Center BAFB

Natural Lighting

Recycled Content Carpet

Low VOC Paints, Adhesives, Sealants

Fitness Center BAFB

Shaded Windows
Reflective Roof

Reflective Parking Surface

Natural Grasses,

Alternative Transportation

Fitness Center BAFB

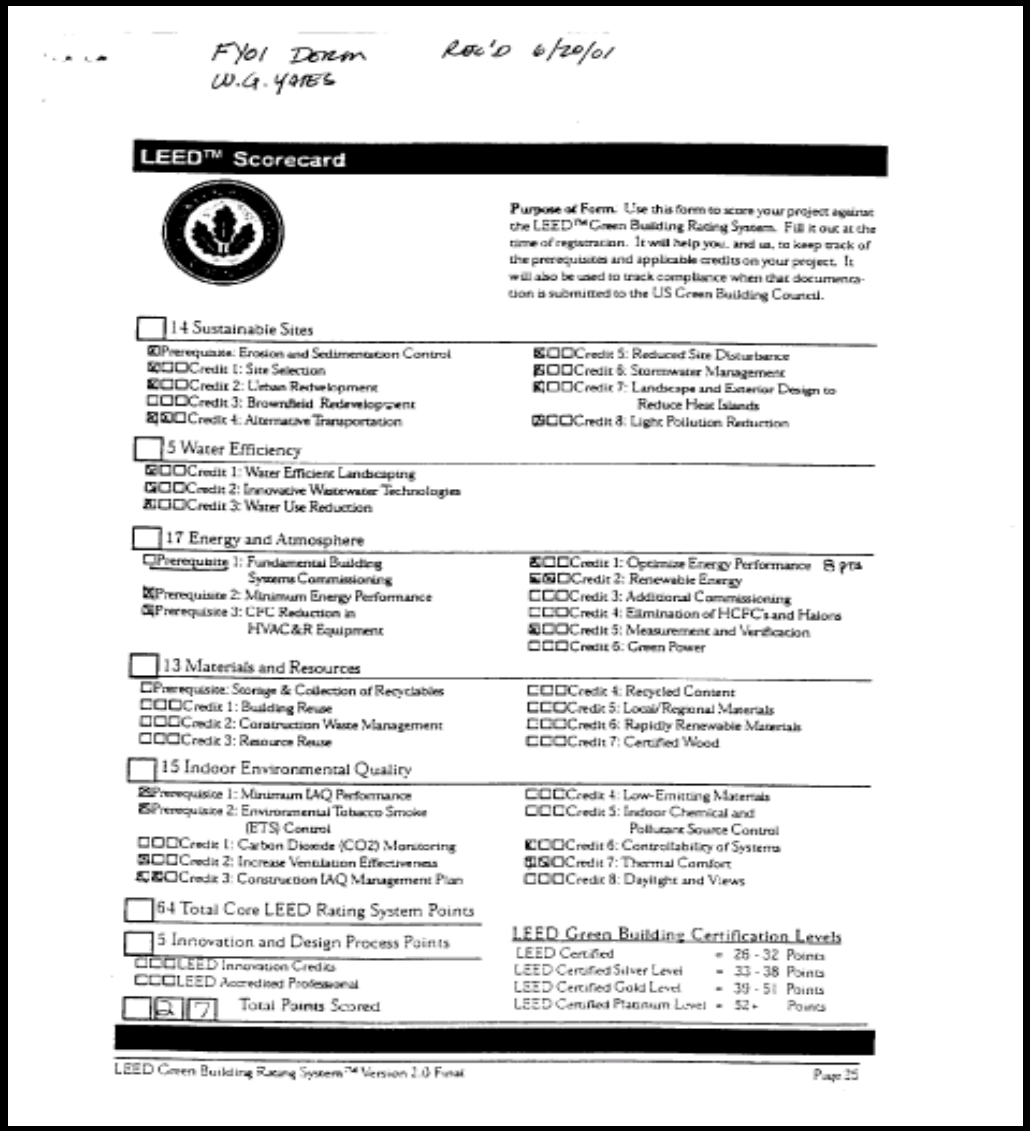
- **Sustainable Features**
  - **Reduced heat islands: reflective parking surface and trees planted to shade parking areas**
  - **Efficient location: close to bus lines and community housing areas**
  - **Alternative transportation: Bicycle racks and shower/changing facilities; electric vehicle station**
  - **Building commissioning: verification of design intent**
  - **Energy efficiency: heat recovery and high efficiency**
  - **Recycled building content materials: focus on recycled content materials: tracking of material content**
  - **Construction waste management: 75% diversion of C&D from landfill**
  - **Indoor air quality: low VOC paints, adhesives, sealants**
  - **Water conservation: low flow fixtures**
  - **Water recovery: rainwater harvesting and reuse for flushing toilets and urinals (40,0000 gal/month)**
  - **Water efficient landscape: use of natural grasses and landscape plantings – no irrigation**

Dormitory BAFB

- FY 01 MILCON
- Design Build Contract
- Required LEED Certified Facility in RFP
- Used LEED Version 2.0 criteria
- Contractor response: Three proposals received, all over budget. Only one contractor wanted to delete sustainable design for cost savings and could not determine the cost reduction.
- Project awarded with LEED requirement intact.

Dorm, BAFB

Preliminary LEED Rating Score Card



FY01 Dorm
W.G. Yates

Rec'd 6/20/01

LEED™ Scorecard

Purpose of Form. Use this form to score your project against the LEED™ Green Building Rating System. Fill it out at the time of registration. It will help you, and us, to keep track of the prerequisites and applicable credits on your project. It will also be used to track compliance when that documentation is submitted to the US Green Building Council.

☐ 14 Sustainable Sites

- ☒ Prerequisite: Erosion and Sedimentation Control
- ☒ ☐ ☐ Credit 1: Site Selection
- ☒ ☐ ☐ Credit 2: Urban Redevelopment
- ☐ ☐ ☐ Credit 3: Brownfield Redevelopment
- ☒ ☒ ☐ Credit 4: Alternative Transportation
- ☒ ☐ ☐ Credit 5: Reduced Site Disturbance
- ☒ ☐ ☐ Credit 6: Stormwater Management
- ☒ ☐ ☐ Credit 7: Landscape and Exterior Design to Reduce Heat Islands
- ☒ ☐ ☐ Credit 8: Light Pollution Reduction

☐ 5 Water Efficiency

- ☒ ☐ ☐ Credit 1: Water Efficient Landscaping
- ☒ ☐ ☐ Credit 2: Innovative Wastewater Technologies
- ☒ ☐ ☐ Credit 3: Water Use Reduction

☐ 17 Energy and Atmosphere

- ☒ Prerequisite 1: Fundamental Building Systems Commissioning
- ☒ Prerequisite 2: Minimum Energy Performance
- ☒ Prerequisite 3: CFC Reduction in HVAC&R Equipment
- ☒ ☐ ☐ Credit 1: Optimize Energy Performance 8 pts
- ☒ ☒ ☐ Credit 2: Renewable Energy
- ☐ ☐ ☐ Credit 3: Additional Commissioning
- ☐ ☐ ☐ Credit 4: Elimination of HCFC's and Halons
- ☒ ☐ ☐ Credit 5: Measurement and Verification
- ☐ ☐ ☐ Credit 6: Green Power

☐ 13 Materials and Resources

- ☐ Prerequisite: Storage & Collection of Recyclables
- ☐ ☐ ☐ Credit 1: Building Reuse
- ☐ ☐ ☐ Credit 2: Construction Waste Management
- ☐ ☐ ☐ Credit 3: Resource Reuse
- ☐ ☐ ☐ Credit 4: Recycled Content
- ☐ ☐ ☐ Credit 5: Local/Regional Materials
- ☐ ☐ ☐ Credit 6: Rapidly Renewable Materials
- ☐ ☐ ☐ Credit 7: Certified Wood

☐ 15 Indoor Environmental Quality

- ☒ Prerequisite 1: Minimum IAQ Performance
- ☒ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control
- ☐ ☐ ☐ Credit 1: Carbon Dioxide (CO2) Monitoring
- ☒ ☐ ☐ Credit 2: Increase Ventilation Effectiveness
- ☒ ☒ ☐ Credit 3: Construction IAQ Management Plan
- ☒ ☐ ☐ Credit 4: Low-Emitting Materials
- ☐ ☐ ☐ Credit 5: Indoor Chemical and Pollutant Source Control
- ☒ ☐ ☐ Credit 6: Controllability of Systems
- ☒ ☒ ☐ Credit 7: Thermal Comfort
- ☐ ☐ ☐ Credit 8: Daylight and Views

☐ 64 Total Core LEED Rating System Points

☐ 5 Innovation and Design Process Points

- ☐ ☐ ☐ LEED Innovation Credits
- ☐ ☐ ☐ LEED Accredited Professional

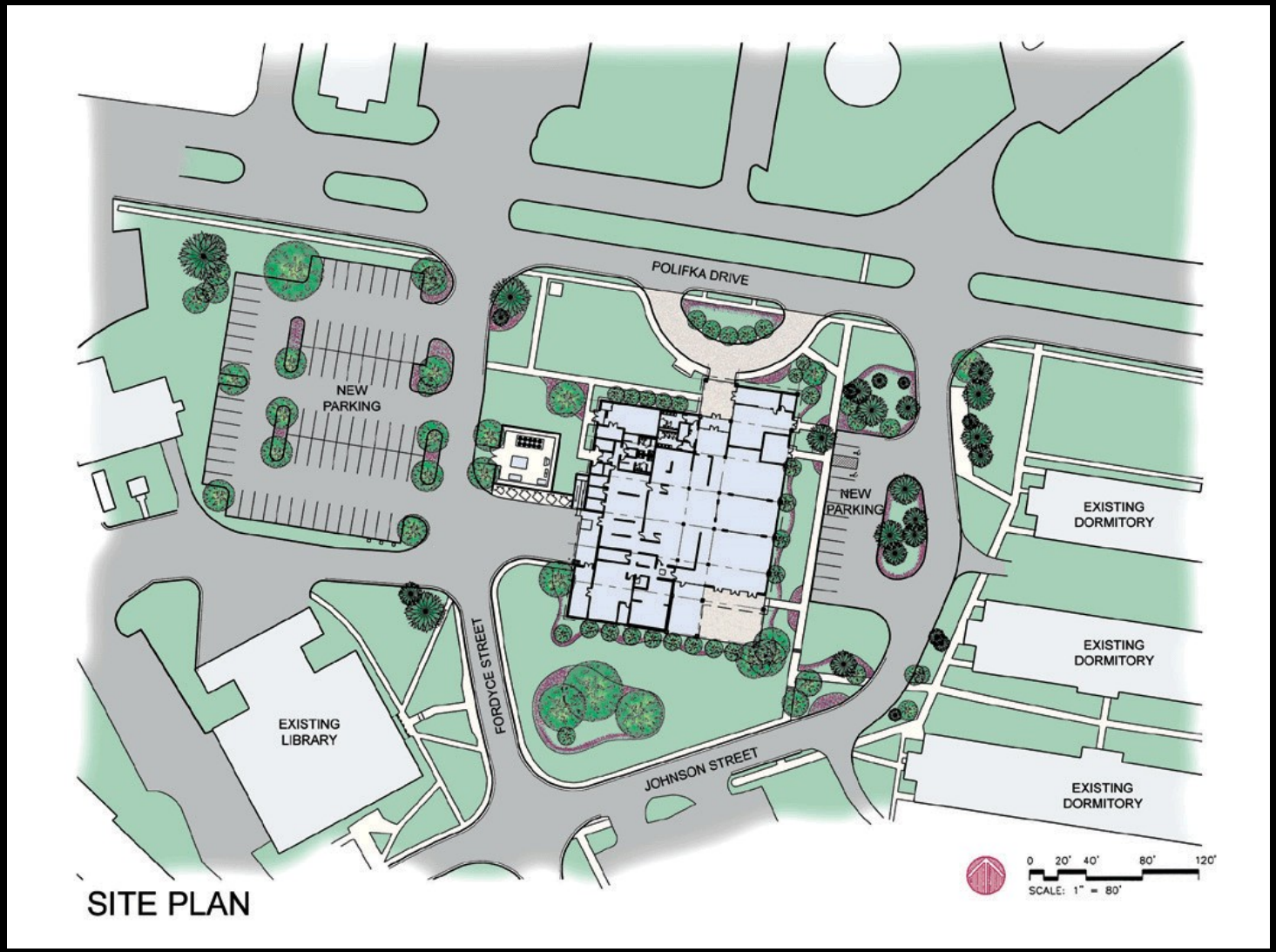
☐ 7 Total Points Scored

LEED Green Building Certification Levels

LEED Certified	=	26 - 32 Points
LEED Certified Silver Level	=	33 - 38 Points
LEED Certified Gold Level	=	39 - 51 Points
LEED Certified Platinum Level	=	52+ Points

LEED Green Building Rating System™ Version 2.0 Final — Page 25

Dining Facility, Shaw AFB



Dining Facility, Shaw AFB

Dining Facility, Shaw AFB

Dining Facility, Shaw AFB

- Goals
  - Award the year of appropriation (FY 01)
    - Design option for LEED applications
    - Extends design period six weeks
    - Additional design fees
  - No scope reductions and within budget (PA)
  - Obtain LEED certification (26 points)
  - Use “Best Value” source selection procurement

Dining Facility, Shaw AFB

- Process
  - Decision Point at 35% design to determine scope of sustainable design effort
  - Evaluate 35% design cost estimate
  - Evaluate obtainable LEED items
  - Conduct strategy meetings to coordinate efforts
    - Base compatibility
    - Maintainability of energy efficient equipment
  - Make design decisions and complete design

Education Center, Shaw AFB

- Project is in ACC FYDP
  - Potential Congressional insert FY 02
- Competed Customer Concept Document (CCD) April 2001
  - Validate customer scope requirements
  - Confirm DD 1391 costing information with CCD parametric cost information
- Identify obtainable LEED sustainable design areas

Lessons Learned

- Sustainable design is an evolving entity
- Designate a Champion
- LEED provides a way to measure the extent of sustainability achieved and provides some methodology guide
- Start early – be involved in the planning, siting and programming to ensure sustainable issues are addressed
- Seek out a specialized consultant if your AE is not experienced
- Evaluate your options and associated costs early in the design process

Lessons Learned

- Don’t accept the status quo, “We are already doing that”
- Don’t required hard metric and recycled content materials – next to impossible to source
- Keep a master file of documents required for LEED certification current as the design and construction develops. The documentation required is overwhelming if you wait until after construction completion to compile it.
- Maintain a record of the decisions made as you go thru the process.